Can the Span of Human Life Be Lengthened?

By GEORGE HENRY HEALD, M. D.

IN THE first place, what is the span of life? Is there a period set by nature—a bound beyond which man may not pass? Is there something in his very being that determines that within a few short decades at most he must age and pass on? Is the "three-score and ten" of the Bible a limit beyond which the average man cannot expect to live?

These and similar questions have been asked of old, and are still being asked. The possibility of increasing indefinitely the span of life has long been an attractive theme. Only recently, Bernard Shaw has issued a series of five plays, entitled "Back to Methuselah," in which he attempts to teach how man may lengthen his life to 300 years or more. In the early days of this continent—the days of discovery and exploration—one Ponce de Leon traveled far and wide, searching for a fabled fountain of immortal youth, and his search was but the expression of the wishes and hopes of many of his day.

There are a number of seemingly well-authenticated cases of persons who lived to be 120, 130, or even 140 or more; but those who have studied most thoroughly into the subject are inclined to doubt the accuracy of such reports, for they do not succeed in finding any cases in which incontestable proofs of the great age can be found; and in those cases in which it is possible to get exact data, they always find that the age has been greatly exaggerated. Only recently an old Kentucky mountaineer was exhibited by interested persons as being more than 130 years old, and they seemed to have made a pretty clear case of it. But a New York physician, who had doubts as to the accuracy of the reported age, made the rough trip into the Kentucky mountains at considerable expense, and there among the old settlers, he obtained positive proof that the decrepit man, who was partially demented, was only about 100 years old. He had been coached by his exhibitors to say that he was more than 130. Students of longevity are inclined to believe that the instances of life much beyond the century mark are much more rare than the extant stories of extreme age would indicate.

Life tables are prepared by officials of the life insurance companies, based on the lives of their policy holders, and also by Government officials, based on mortality statistics, showing the life expectation at different ages, for different classes of persons. For instance, some insurance statistics show a greater expectation of life for those who are total abstainers from liquor than for moderate drinkers, and a greater expectation for moderate drinkers than for steady or hard drinkers. As fire insurance companies give a better rate on buildings of slow-burning construction than for ordinary buildings, so certain life insurance companies give better rates to abstainers than to drinkers. These better rates, usually in the form of return dividends, are based on the actual saving of life among the abstaining policy holders.

These insurance companies have shown that if one desires to live long he should abstain from liquor. It is true that occasional instances are cited of drinkers living to a great age; but the statistics computed from millions of individual lives show that such cases are exceptional. The average drinker is a short-lived person as compared with the average abstainer. Temperance, then, or rather abstinence, is one means of lengthening life. Are there others? It is the purpose of this article to discuss this question.

The Bureau of the Census has published a series of life tables based on the estimated population July 1, 1910, and on the reported deaths in 1909, 1910 and 1911, for the original registration area, and for the different states, for various classifications of the population. The accompanying abbreviated table gives figures taken from these official life tables, which show that the life expectation varies with sex, race, location (city or country) and nativity (whether native or foreign born). For instance, women, except those in rural districts, are longer-lived than men; whites are much longer-lived than Negroes; and native-born are slightly longer-lived than foreign-born (the latter not shown in this table). Moreover, the tables prepared for different states show striking differences, due probably to the proportion of urban and rural population. For instance, the life expectation at birth for the different states studied and for the original registration states, is thus given:

Life Expectation at Birth

	Male	Female
Indiana	54.70	56.16
Michigan	53.86	56.24
Registration States	*49.86*	*53.24*
Massachusetts	49.33	53.06
New Jersey	49.08	52.80
New York	47.89	51.89

It would seem, then, that, notwithstanding the cities have done much to lower death rates, and that sanitation in the cities is much more perfect than in the country, it was safer to live in the country than in the city in 1910. It is possible that the improvement in city sanitation in the last 10 years may give a better showing for the cities in later life tables.

How are we to account for the better life expectation in rural districts than in the cities? Is it due to the fact that people in rural districts as a rule live a more simple and natural out-of-door life? Such an explanation would account for the paradox that the rural woman is an exception to the fact that females in general are longer-lived than males.

It will be noted from the table that Negroes are very much shorter-lived than the whites. Is this a racial characteristic, or is it incident to the fact that on the whole the Negroes, because of poverty or ignorance or both, live a much more unwholesome life than the whites? The Negro is peculiarly susceptible to tuberculosis, and the tuberculosis mortality among this race is exceptionally high. On the other hand, the Negro is comparatively immune to malaria and to the effects of hookworm disease. That is, these diseases are much lighter with the Negro than with the whites. These racial differences as regards different diseases suggest that there may be a racial difference in longevity, independent of the fact that the Negro as a rule lives under more unfavorable conditions.

In addition to racial differences in longevity, there are apparently also family differences. It is a matter of common observation that certain families are unusually long-lived. Physicians, when they desire to express opinion as to the outcome of a doubtful case, inquire into the family history. If the patient is of a long-lived race, or family, the outlook is better than if he is of a short-lived family.

In the city people commonly turn night into day, and possibly live through as much in five years as country people live through in 10 years. It is not at all surprising that an automobile that runs 10,000 miles a year, other things being equal, will wear out sooner than another machine that runs only 5,000 miles a year.

These are some of the factors that have to do with the problem of longevity. Then there is the general question of germs and infection. About 40 years ago, the discovery was made that disease is often caused by minute organisms, known as germs, or bacteria. Later, other microscopic organisms belonging to the animal kingdom, were shown to be the cause of certain diseases, such as malaria, yellow fever and sleeping sickness. For a time the germ theory overshadowed everything else, and disease prevention was reduced to the simple problem of swatting the germ. Latterly it has become apparent that swatting the germ is more than a man's job, and is practically impossible of accomplishment. That is, the tuberculosis germ, for example, is here with us to stay, and no amount of fumigation, or disinfection, or sterilization will get rid of it. We have also learned that this germ is not such a terrible fellow after all. It will take quarters with a person for a lifetime and does in many cases without doing much damage. We have learned that while it is important to limit the spread of disease germs as much as possible, and to prevent their propagation, the surest protection against germ invasion is a sound body. And a sound body is very largely a matter of proper nutrition.

Your Chances of Reaching a Ripe Old Age

Classification of population, original registration states.	SEX	Life expectation at birth—average longevity	Of 100,000 born, number that reach fifth year	Number that reach twentieth year	Number that reach fiftieth year	Age at which half of original number are still alive
	Both sexes	51.49	83,887	80,074	62,460	60-61
	Males	49.86	82,718	78,792	60,118	58-59
	Females	53.24	85,117	81,418	65,001	62-63
White	Males	50.23	82,972	79,116	60,741	59-60
	Females	53.62	85,349	81,750	65,629	63-64
Negro	Males	34.05	68,589	61,426	35,427	34-35
	Females	37.67	72,768	64,764	40,886	40-41
CITY						
White	Males	47.32	81,185	77,122	56,913	55-56
	Females	51.39	83,374	79,962	63,058	60-61
COUNTRY						
White	Males	55.06	86,223	82,674	67,734	65-66
	Females	54.70	86,536	82,648	66,735	64-65
NATIVE						
White	Males	50.58	82,722	78,923	60,772	60-61
	Females	54.19	85,121	81,526	65,723	64-65

The Future of Food Growing—By F. B. NICHOLS

DESPITE the economic ills with which agriculture is now confronted, it is evident that the business of growing food is on a secure basis. The farms are going to produce crops large enough to meet the demands of the cities, and at fair prices. Through the use of improved machinery and the growth of the co-operative movement in marketing, it will be possible for the producers to do this and get a fair return for their toil. We are just at the beginning of a great extension in the use of improved implements—the era of machinery is here! This movement, by the way, is typically American.

The man production from the farms of the Great Mississippi River Valley has long been the wonder of agricultural students the world over. It is, for instance, about three times the production of the average French farmer, and the contrast is even more encouraging when compared with the producers of India or China. But it is evident that it can be increased still further, through the use of good tools. For the farmer this will mean larger returns, and at a lower expenditure of physical labor. For the laborer in the industrial centers, it means ample supplies of food, at prices he can afford to pay.

In the production of grain the benefits of improved machinery have been especially evident. It is a long way in the economic evolution of the human race from the "man with the hoe" and the cradle, to the man with the tractor of today. In this connection it is evident that the artists who have been showing the farmer as merely one who toils with his hands should get more of a modern version of things. This progress which farming has made has been shown by a huge increase in production, that is steadily developing with the years, and which will coutinue to grow. More than that, the work is much easier. Man has been able to invent few forms of drudgery more difficult than harvesting grain with a cradle. What a contrast to the modern farmer, who "knocks down" 25 acres a day with a tractor hitched to an eight-foot binder! And the combination harvester-thresher, which harvests and threshes the grain all at one operation, makes an even more pleasing contrast.

As a rule, the farm implements of today have been developed with the best methods of soil management in mind. Take with tractors and wheat—the great bread crop—for example. If the best yields of winter wheat are to be grown, the soil must be plowed deeply and as soon as possible after harvest, which means in July in the great surplus grain-producing states like Oklahoma, Kansas and Nebraska. Naturally the weather is warm—perhaps hot would be a better term ——at this time of the year, and when the horses must supply the power the acreage which can be covered with each individual outfit is small. This is a tremendous handicap in the more important wheat sections, where the grain acreage on almost every farm is large. The net result is that where horses are used the plowing is continued until along in the autumn, and much of the crop is planted on seed beds prepared in a very inefficient way.

But how different it is when power work is the rule! The farmer gets the tractor started as soon as possible after the wheat is off the ground, and he makes some real speed. There is no stopping for a "breathing spell" as there is with horses; the tractor goes right ahead through the heat, with only an occasional stop for fuel, water and oil, for many hours every day. And this relieves the horse—man's friend—from one of the worst forms of killing work known. Many wheat growers put a headlight on their tractor and run it day and night, and naturally cover an immense acreage.

The work is done properly; six inches or more is a common plowing depth; and the conditions are made favorable by this early, deep plowing for the forming of available plant food, and, of course, the moisture is conserved, for the surface is broken. After the plowing is finished it is important that the soil be cultivated enough, usually with a disk, to keep the crust broken and the weeds killed. As a rule this work is done with a tractor when one is available; the lighter engines are especially well adapted for disking and harrowing.

When a field is handled in this manner, the soil usually is in ideal condition in the autumn for the crop, and the plants make a quick growth after sowing. They thus go through the cold weather with a minimum of winter killing. As a result they are in a favorable condition to make a quick start the following spring toward maturity and a high yield.

Then when the crop is sold in a co-operative way, either by a local association or as it will be largely in the future, through a powerful commodity marketing association, such as the proposed United States Grain Growers, Inc., we have almost an ideal production and sales system. Intelligent production and efficient selling are the two things which guarantee fair prices to the producer and buyer, in both country and city.

The general distribution of tractors because of the real power supplied, has done much to encourage the use of other forms of big machinery, such as silage cutters, power cultivators, large binders, tile-ditching machines and the like.